NOTE XXV.

ON A NEW COLLECTION OF PODOPHTHALMOUS CRUSTACEA, PRESENTED BY M^r. J. A. KRUYT, COLLECTED IN THE RED SEA NEAR THE TOWN OF DJEDDAH.

BY

Dr. J. G. DE MAN.

Mr. J. A. Kruyt, Dutch consul at Djeddah, again presented many very interesting podophthalmous crustacea to our Museum, for which we feel very grateful, because they complete in a high degree our collection of Red Sea crustaceans. Before stating my observations on some forms I wish to give a list of the species and specimens collected, to illustrate in some sense the comparative frequency of occurrence of some species.

List of the species collected.

1.	Tylocarcinus styx Herbst	3	specimens.
2.	Cyclomaia spinicincta Heller	2	»
3.	Stilbognathus erythraeus Martens. . . .	1	»
4.	Lophactaea cristata Alph. M. Edw. . .	5	»
5.	» granulosa Rupp.	1	»
6.	Actaea tomentosa M. Edw.	1	»

7.	Actaea hirsutissima Rupp.	3	specimens.
8.	» rufopunctata M. Edw.	3	»
9.	» helleri Alph. M. Edw.	3	»
10.	» nodipes Heller	2	»
11.	» fossulata Girard	4	»
12.	Chlorodius niger Forsk.	58	»
13.	» sculptus Alph. M. Edw.	1	»
14.	Phymodius obscurus Lucas	16	»
15.	Chlorodopsis spinipes Heller	1	»
16.	Etisus laevimanus Randall.	12	»
17.	Cymo andreossyi Aud.	3	»
18.	Trapezia cymodoce Herbst.	71	»
19.	» rufopunctata Heller	13	»
20.	» digitalis Latr.	6	»
21.	» ferruginea Heller.	6	»
22.	» guttata Rupp.	3	»
23.	Tetralia cavimana Heller	3	»
24.	Neptunus pelagicus L.	1	»
25.	Thalamita savignyi Alph. M. Edw.	15	»
26.	Thalamitoïdes tridens Alph. M. Edw.	2	»
27.	Metopograpsus messor Forsk.	1	»
28.	Pagurus scabrimanus Dana?	1	»
29.	Calcinus intermedius n. sp.	1	»
30.	Coenobita rugosus M. Edw.	2	»
31.	Porcellana boscii Aud.	1	»
32.	» carinipes Heller	1	»
33.	Alpheus edwardsii Aud.	4	»
34.	» strenuus Dana.	3	»
35.	» laevis Randall.	65	»
36.	» insignis Heller	1	»
37.	Hippolyte hemprichii Heller	6	»
38.	Gonodactylus graphurus White	18	»
39.	Bopyrus sp. in *Trap. cymodoce* Herbst.	1	»

Tylocarcinus styx Herbst.

In two of the three male specimens, the hands are enlarged, and the fingers greatly arcuated as is figured by

Alph. Milne Edwards (Nouv. Arch. Mus. Hist. Nat. VIII, p. 247. pl. XI, fig. 4), but in the third specimen the hands are slender, the fingers straight and meeting over their whole length. I regard these differences as individual ones, as has been done also by Mr. Miers (Descript. of new or little known Spec. of Maioid Crustacea, in: Ann. and Mag. of Nat. Hist. for July 1879).

Lophactaea cristata Alph. Milne Edwards.

Lophactaea cristata, Alph. Milne Edwards, Nouv. Arch. Mus. t. I, pag. 246, pl. XVI, fig. 1. There are 5 specimens collected, one nearly adult male, one nearly adult female and three young females. — In all these specimens the crest on the upper margin of the hand is very distinctly developed, though being granular, but it is not only by this crest, that our species may be distinguished from the nearly allied *granulosa* Rupp., but especially also by its quite different facies, by the *much coarser* granules of the carapace, which are found also on the mesogastrical and cardiacal regions. —

Breadth of carapace of the largest male specimen 32 mm.
» » » » » » female » 36 mm.

Lophactaea granulosa Rupp.

As has been remarked already by Mr. Hilgendorf (Monatsberichte Berlin. Akad. Nov. 1878, pag. 787), also a small granulated crest-like ridge often appears to occur on the upper margin of the hands of the common *Lophact. granulosa*, a species distributed throughout the whole Indo-Pacific region. I therefore think a very young male specimen of the collection (Breadth of carapace 17 mm.) to belong to the *granulosa*, the granules of the carapace being much smaller than in equally-sized specimens of the preceding species, and the mesogastrical and cardiacal regions being nearly *smooth*.

Actaea hirsutissima Rupp.

Two male specimens and an adult female with eggs are in the collection: the male specimens having the carapace 22 mm. broad, the adult female only 18 mm.

Actaea rufopunctata M. Edw.

The three specimens are again of the same small size as that, which I described in my former Note on the Djeddah Crustaceans (Notes of the Leyden Museum, Vol. II, pag. 172), the largest male specimen having the carapace only 14 mm. broad. The grooves between the regions are covered with a dense pubescence, and the whole surface of the carapace is covered with tolerably long hairs. — I therefore still doubt whether these specimens really belong to the true *rufopunctata* Edw.

Actaea helleri Alph. Milne Edw.

Actaea helleri Alph. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. I, pag. 270, pl. XVII, fig. 3, 3a, 3b.

Three fine specimens (2♂, 1♀) of this very rare species, the habitat of which was still unknown, were collected on the shores of the harbour of Mecca. — Carapace enlarged, convex in all directions, regularly curved anteriorly. Regions bordered by tolerably broad but shallow grooves and, like the nearly entire, undivided, finely curved anterolateral margins, provided with numerous, conical, acute small tubercles, that are less prominent and more granular on the cardiacal and intestinal regions; the few concave, nearly straight posterolateral margins being more minutely granulated. Front very deflexed and prominent, scarcely emarginate neither in the middle nor at the sides. Under surface of the carapace minutely granulated near the anterolateral margins, but the outer surface of the externall maxillipeds, of the sternal plate and of the terminal joint of the male abdomen are more or less punctate, the basal joints of it, like those of the oval female abdomen, being somewhat granular. The anterior legs are of the same size, both in the male and in the female, the arms not projecting beyond the lateral margins of the carapace; the outer surface of the carpopodites is provided with similar tubercles as on the carapace, like also the rounded upper surface and the outer surface of the hands, though these conical tubercles become smaller near the inferior margin and disappear at last entirely. The upper surface of the strongly curved mobile finger is armed with sharp small tubercles, the internal margins of both fingers being armed each with a strong basal tooth, on both sides of which a small tuft of stiff yellow hairs is found as well on the mobile as on the immobile finger (and not only on the latter, as is described by Mr. Milne Edwards); the ends of the fingers are acuminated and the internal surface of the hands is minutely granulated. Ambulatory legs compressed, the three terminal joints being armed with sharp small tubercles, and the external surface of the meropodites of the posterior legs as also the under margins of the meropodites of the other legs are granulated.

Our specimens are of a beautiful red colour, enhanced especially on the upper surface of the carapace by the dark red colour of the conical tubercles: the ends of the black fingers are white, and the black colour extends in the male from the immobile finger over the lower half of the outer and inner surface of the hands, but not in the female. The whole upper surface of the carapace, as also the outer surface of the legs is covered with numerous tolerably long and finely yellowish coloured hairs.

Breadth of carapace in the male 25 mm.
Length » » » » » 16 mm.
Breadth » » » » female 21 mm.
Length » » » » » 14 mm.

Actaea helleri may be easily distinguished by its entire, undivided anterolateral margins, the sharp conical tubercles of carapace and legs, covered with long fine yellowish hairs and by the characteristic shape of the hands: the tufts of yellow hairs on both fingers, that are acuminated, the much curved mobile finger, the strong teeth of the latter, etc.

Chlorodius niger (Forskal) Rüpp.

The collection contains 58 specimens of different sizes of this very common Indo-Pacific species, varying greatly as regards the structure of the teeth of the antero-lateral margins, these teeth being sometimes (in young specimens) acute, in other individuals obtuse, quite as has been fully described by Alph. Milne Edwards (Nouv. Arch. Mus. t. IX, pag. 215).

Chlorodius sculptus Alph. Milne Edwards.

Chlorod. sculptus, Alph. Milne Edwards, Nouv. Arch. Mus. t. IX, pag. 217, pl. VIII, fig. 4.

A fine male specimen is in the collection, wholly agreeing with the description, though I will add something to it. — The carapace is 19 mm. broad and 12 mm. long, the two anterior teeth of the lateral margins being obtuse, the third a little more acute, and the fourth acuminate with a black point. The several lobes of the surface of the carapace, though being smooth, are minutely punctate and the posterior margin of the cephalothorax is somewhat granular. The upper margin of the meropodites and also the other joints of the ambulatory legs are *spilunose* (not granular, as says Milne Edwards) and covered with long yellow hairs. The upper (posterior) margin of the anterior legs is armed with three or four small obtuse granules.

Chlorodopsis spinipes Heller.

Pilodius spinipes Heller, Crustaceenfauna des Rothen Meeres, p. 340, pl. II. fig. 22.

Chlorodopsis spinipes, Alph. Milne Edwards, l. c. pag. 230, pl. VIII, fig. 6.

A single female specimen, with the carapace 8 mm. broad, is in the collection.

Etisus laevimanus Rand.

Four male and eight female specimens were again collected; in some specimens the surface of the carapace is ornamented with more or less numerous dark spots, more or less distinctly marked, (*Etisus maculatus* Heller), but in other individuals these spots are quite wanting, the carapace being coloured with some large dark spots. The largest specimen, a male, has the carapace 36 mm. broad.

Thalamita savignyi Alph. Milne Edw.

In all our specimens, ten males and five females, the surface of the carapace is covered with a dense pubescence of very short hairs. In one adult male there are only three spines on the left antero-lateral margin, but there are five teeth on the right, the fourth of which is rudimentary.

Thalamitoïdes tridens Alph. M. Edw.

Alph. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. T. V., pag. 149, pl. VI, fig. 1 and 7.

A male and a female specimen provided with eggs are collected, as I think, for the first time in the Red Sea; our species is thus distributed throughout the whole Indo-Pacific region, being found also on the shores of Madagascar and Upolu. The breadth of carapace of the female (the distance of the external orbital angles) is only $10^1/_2$ mm.

Pagurus scabrimanus Dana?

A single specimen of *Pagurus*, inhabiting the shell of a *Strombus gibberulus*, is in the collection, which I refer with some doubt to the *Pag. scabrimanus* Dana. As regards the shape of the carapace, the relative length of the the eyes and of the vicinal parts, the shape of the larger hand and of the two last joints of the left ambulatory leg of the third pair, our specimen agrees very well with the figures of these parts of the body in the great work of the American naturalist. But I will allow myself the liberty to give a description of our specimen. The anterior part of the carapace is nearly shaped as that of the common *Pag. punctulatus* Oliv., but it is more depressed and flattened and also more transverse, being somewhat broader than long: its length (the distance from the front to the sutura cervicalis) measuring $5^1/_3$ mm., its breadth 6 mm. The anterior margin of the carapace is quite similarly shaped as in the *punctulatus*, the lateral margins are straight, the gastrical region has also the same form as in that species, the two lines that border it posteriorly making nearly a right angle with one another (in the *Pag. depressus* Heller, this angle is much more acute), and the distribution of the small tufts of hair on its surface and at the margins wholly agrees with that of the *punctulatus*. The eyes are rather short and gross, scarcely as long (the basal scale included) as the breadth of the anterior margin of the carapace, the basal scale of them being rather quadrangular and broad and armed with some few teeth and hairs on their anterior inner angle; they are a little longer than the peduncle of the external antennae, but scarcely as long as that of the internal. Carpopodite of the left anterior leg armed with some spines at its upper and outer margins and on the inferior part of the external surface. — Form of the larger (left) hand wholly agreeing with the figure of Dana; upper margin armed with many strong spines, under margin denticulate, upper half of the convex outer surface spinulous, under half nearly smooth; upper margin of the mobile finger spinulous, outer surface of the fingers and upper half of the outer surface of the hand covered with many long scattered hairs, inner convex surface of the hand smooth with some few hairs. — Fingers acuminate with horny, a little spoonlike tips. Upper margins and outer surfaces of the carpopodite and the hand of the right anterior leg armed with many strong spines and more closely provided with long horny hairs than in the left leg. Tarsi of the ambulatory legs elongate and like the penultimate joints compressed; tarsus und penultimate joint of the left ambulatory leg of the third pair quite resembling Dana's figure, outer surface of the tarsus being flattened and provided with a longitudinal groove, its upper somewhat convex margin, as also the upper margin of the penultimate and the anterior margin of the antepenultimate joint being spinulose; the two last joints of these ambulatory legs closely covered with many horny long hairs.

Dana makes no mention of the occurrence of the long hairs on the hands in his *Pag. scabrimanus*, and the upper part of the outer surface of the larger hand appears to be less spinulous in this species than in our specimen; the mobile finger of the large hand, very spinulous in the Djeddah specimen, is «hardly spinulous" in the other. The *scabrimanus* occurs in the Philippine Archipelago, but this cannot cause any difficulties, many other species of *Pagurus* having also a wide geographical range, as for instance, the *Pag. punctulatus* that occurs in the Red Sea, the China seas and on the shores of the Sandwich isles. Our species may also be nearly allied to or identical with the *Pag. spinimanus* M. E. or the *scutellatus* M. E., but the description (without figure) of these species by Mr. Milne Edwards (Ann. Scienc. Nat. III Série, tome X, pag. 61) is too short for us to be able to recognize them. Our specimen is of a uniform light gray or yellowish colour without any spots.

Calcinus intermedius, n. sp.

A single specimen of *Calcinus*, inhabiting like the preceding species, the shell of a *Strombus gibberulus*, was collected at Djeddah and I think it to be new, though it is most closely allied to *Calcinus rosaceus* Heller from the Red Sea and *Calcinus nitidus* Heller from Taiti.

I will first mention the characteristic differences between these two species and afterwards describe our specimen more fully.

Our species may be distinguished at first sight from the *rosaceus* Heller by the rounded convex upper margin of the larger hand being *quite unarmed*, without tubercles, by the fingers of the larger hand being punctate but not granular and by its coloration, the basal half of the tarsi being violet-colored. It differs from the *Calcinus nitidus* from the shores of Taiti distinctly by the under margin of the larger hand not being rounded, but being rather *acute and granular*, by the more hairy ambulatory legs and also by the coloration, the larger hand being quite of a white color without yellowish spots as are seen in the Taiti species.

Anterior part of carapace rather a little convex, smooth, punctate anteriorly, somewhat hairy on the lateral margins; gastrical region only defined posteriorly by two lines that make an almost right angle with one another, but without a short median line in its anterior part as is found in the *rosaceus* of Heller. Rostrum very small, triangular and acute, external angles of the frontal margin rather rounded.

Eye-peduncles very slender, longer than the width of the frontal margin, and also much longer than the peduncles of the external and internal antennae; ophthalmic scales extremely small, triangular and acute. Basal spine of the external antennae very short. Anterior legs very unequal, arm with an acute upper margin; upper margin of the carpus rounded and terminating anteriorly in a very small acute spine, its outer surface provided with a tubercle, which is separated from the upper margin by a distinct groove, quite as appears to be the case with the *Calcinus rosaceus*. The larger (left) hand scarcely compressed, its outer surface rather convex, upper margin rounded, quite unarmed, under margin rather acute and provided with a ridge of granules; fingers nearly as long as the palm, slightly arcuated, leaving an hiatus when closed, their inner margins on the external side somewhat crenulated near the base, and provided with some hairs more internally; outer and inner surface of the palm quite smooth, the latter with some hairs near the articulation of the fingers, that are slightly excavated at the ends and minutely punctate. Arm of the right chelipede shaped as that of the left, carpus with an acute upper margin that is armed with two or three obsolete spines but terminates in a distinct spine; its outer surface rather little convex and smooth. Hand much compressed, upper margin cristate and armed with five acute spines, under margin rounded, fingers very short, with excavated tips, upper surface of the mobile finger rounded and armed with some small spines placed biseriately; outer surface of the palm and of the fingers covered with some few hairs. — Ambulatory legs of the second and third pair a little longer than the larger (left) chelipede; tibia of the second pair armed with two spines, a larger and a smaller one, on the anterior margin, tibia of the third pair only with one spine; tarsi scarcely shorter than the penultimate joints, armed with a series of minute spines on their inferior margin, claws rather curved: — the two last joints of these legs being provided with some scattered tufts of hair both on their upper and under surfaces.

As regards the coloration of our specimen (preserved in spirits), it is of a light rose colour, more especially pronounced on the anterior part of the carapace, and on the meri and carpi of the legs; the anterior margins of the meri and of the carpi of the chelipedes are coloured bluish, the larger hand entirely of a white colour except the bluish-marked articulation of the mobile finger; the spines on the upper margin of the right hand and the articulation of its mobile finger being also of a light bluish colour, but the ends of the fingers are quite white. The basal half of the penultimate joints of the two ambulatory legs is rose-coloured, the distal half white, and the basal half of the tarsi is marked with the characteristic violet cincture, the distal part being again white: finally the claws are black.

The length of the whole cephalothorax of our specimen measures nearly 10 mm., the width of the frontal margin 4 mm., the length of the eye-peduncles 5 mm., the length of the larger hand (fingers included) 9 mm., its height $4^1/_2$ mm., mm., near the articulation of the mobile finger.

Porcellana boscii Aud.

A single female specimen. The carapace and the ambulatory legs are of a light yellowish reddish colour, the chelipedes of a beautiful rose-colour: the whole upper surface of the animal is spotted with numerous dark red spots, which are somewhat more intensely-coloured on the chelipedes. Anterior margin of the carpopodite armed with four teeth.

Porcellana carinipes Heller.

Heller, Beiträge zur Crustaceen-Fauna des rothen Meeres, in: Sitzungsber. Kais. Akad. der Wissensch. XLIV. Band, pag. 257, taf. II, fig. 5.

A very fine female specimen was collected. Though it wholly agrees with the quoted description, it may be allowed to add a few particulars. — In our specimen the whole upper surface of the carapace, except the cardiacal and intestinal regions, is covered with short transverse rugose lines, which are provided anteriorly with very short hairs as in the preceding species, and the cardiacal and intestinal regions are also a little hairy. The anterior margin of the meri of the chelipedes is provided with two spines near the inner angle, a larger outer and a smaller inner one, and with a strong spine at the external angle. The anterior margin of the carpi of *both* chelipedes is armed with three teeth, the posterior margin with four teeth, becoming gradually smaller backwards. The outer margin of both hands armed with six very small teeth. The upper surface of the carpi and of that part of the hands, which is situated outwards of the elevated ridge, is covered with many curved rugose lines that are hairy anteriorly; the remaining external part of the surface of the hands closely covered with numerous similar but very small and short rugose hairy lines. Our specimen is very beautifully coloured, being of a light rose colour, and marked with purplish red and white large spots, the penultimate and antepenultimate joints of the ambulatory legs being violet-coloured with some few white cinctures.

Alpheus edwardsii Aud. and *Alpheus strenuus* Dana.

Conf. Hilgendorf, Die in Moçambique gesammelten Crustaceen, in: Monatsberichte der Akad. der Wiss. zu Berlin. Nov. 1878. pag. 830.

Four specimens of the true *A. edwardsii* Aud. and three of the form, regarded by Hilgendorf as belonging to the *A. strenuus* Dana were collected at the same locality. The former wholly agree with the figure of Savigny in the «Description de l'Egypte, Taf. X, fig. 1", as regards the relative length of the ambulatory legs of the second and third pair and the relative proportions of the joints of the carpus: the legs of the second pair being rather longer than that of the third pair, and the second joint of the carpus being longer than the fifth. Our four specimens are all females, provided with eggs.

Like Mr. Hilgendorf, I too cannot decide positively, whether our three other specimens [1]), which, according to that author, on account of the shape of the smaller hand should be referred to the *strenuus* Dana, are male or female, *but they are not provided with eggs.* Except in the shape of the smaller hand and of the second joint of the abdomen (Hilgendorf, l. c. p. 831), these specimens however *wholly* agree in all respects with the four other specimens of the true *edwardsii* in our collection, as regards the relative length of the legs of the second and third pair and the relative proportions of the joints of the carpus. Might it therefore not be possible that the described differences in the shape of the smaller hand and of the second joint of the abdomen must be regarded as sexual ones? This is however only a mere supposition. I however will add still this: according to the diagnose of the *Alpheus strenuus* by Dana, the second joint of the peduncle of the internal antennae should be almost twice as long as the first, and the first and the second joint of the carpus should be nearly equal: in our three specimens however, (wholly agreeing in these points with the four *edwardsii*-specimens), the second joint of the peduncle of the internal antennae is but little longer than the first joint, and the first joint of the carpus is distinctly much longer than the second joint. I therefore am inclined to presume the true *strenuus* Dana to be a species different from our form, and the latter to be the male of the *Alph. edwardsii* Aud.

Alpheus laevis Randall.

More than 60 fine specimens, of which the half females, were collected. This species is therefore very common on the Djeddah shores, but it is recorded from the whole Indo-Pacific region. In nearly all our specimens,

---

1) These specimens entirely agree with an *Alpheus*, presented by Mr. Kossmann to our Museum under the name of *Alpheus crassimanus* Heller. But I think the *Alpheus crassimanus* Heller to be a quite different, though allied species.

the two hands of the chelipedes are marked with more or less numerous spots of a dusky gray, and often the beautiful red colour of these hands is more or less extensively substituted by a light grayish colour. In one specimen I observed a remarkable monstrosity: the orbits being united with one another, the substance of their walls passing over and pressing down the rostrum, the orbits being almost rounded anteriorly without spines.

Alpheus insignis Heller.

Heller, l. c. pag. 269, taf. III, fig. 17, 18.

A single fine female specimen is in the collection. The second joint of the carpus of the second pair of legs is distinctly *longer* than the first.

Hippolyte hemprichii Heller.

Heller, l. c. p. 275, Taf. III, fig. 23.

Six specimens of this species were collected, but I think it most probable this form is identical with the common *Hippolyte gibberosus* M. Edw.

LEIDEN, March 1881.